

## Common Cysteine Backbone

|                    |            |            |            |            |            |
|--------------------|------------|------------|------------|------------|------------|
| 1                  |            |            |            |            | 50         |
| human_gremlin.pro  | -----      | -----      | -----      | -----      | -----      |
| human_cerberus.pro | MHLLLFQLLV | LLPLGKTTRH | QDGRQNOSSL | SPVLLPRNQR | ELPTGNHEEA |
| human_dan.pro      | -----      | -----      | -----      | -----      | -----      |
| human_beer.pro     | -----      | -----      | -----      | -----      | -----      |
|                    | 51         |            |            |            | 100        |
| human_gremlin.pro  | -----      | -----M     | SRTAYTVGAL | LLLLGTLLPA | AEGKKKGSQG |
| human_cerberus.pro | EEKPDLFVAV | PHLVAT.SPA | GEGQRQREKM | LSRFGRFWKK | PEREMHPSRD |
| human_dan.pro      | -----      | -----      | -----      | -----      | -----      |
| human_beer.pro     | -----      | -----      | -----      | ----MQLPLA | LCLVCLLVHT |
|                    | 101        |            |            |            | 150        |
| human_gremlin.pro  | AI.PPPDKAQ | HNDSEQTQSP | QQPGSRNRGR | GQGRGTAMPG | EEVLESSQEA |
| human_cerberus.pro | SDSEFPFPGT | QSLIQPID.G | MKMEKSPLRE | EAKKFVHHFM | FRKTPASQGV |
| human_dan.pro      | -----      | -----      | -----      | MLRVLVGAVL | PAMLLAAPPP |
| human_beer.pro     | AFRVVEGQGW | QAFKNDATFI | IPELGEYPEP | PPELENNKTM | NRAENGGRPP |
|                    | 151        | ↓          | ↓          | ↓          | 200        |
| human_gremlin.pro  | LHVTERKYLK | RDWCKTQPLK | QTIHEEGCNS | RTIINRF.CY | GQCNSFYIPR |
| human_cerberus.pro | ILPIKSHEVH | WETCRTVPFS | QTITHEGCEK | VVVQNNL.CF | GKCGSVHFP. |
| human_dan.pro      | INKLALFPDK | SAWCEAKNIT | QIVGHSGCEA | KSIQNRA.CL | GQCFSYSVFN |
| human_beer.pro     | HHPFETKDVS | EYSCRELHFT | RYVTDGPCRS | AKPVTELVCS | GQCGPARLLP |
|                    | 201        | ↓          | ↓          |            | 250        |
| human_gremlin.pro  | HIRKEEGSFQ | SCSF...CKP | KKFTTMMVTL | NCPQLQPPTK | K.KRVTRVKQ |
| human_cerberus.pro | ..GAAQHSHT | SCSH...CLP | AKFTTMHLPL | NCTELSSVIK | V...VMLVEE |
| human_dan.pro      | TFPQSTESLV | HCDS...CMP | AQSMWEIVTL | ECPGHIEVPR | VDKLVEKILH |
| human_beer.pro     | NAIGRGKWWR | PSGPDFRCIP | DRYRAQRVQL | LCPGGEAPRA | RKVRLVAS.. |
|                    | ↓↓         |            |            |            | 300        |
| human_gremlin.pro  | CRÇ.ISIDLD | -----      | -----      | -----      | -----      |
| human_cerberus.pro | CQCKVKTEHE | DGHILHAGSQ | DSFIPGVSA- | -----      | -----      |
| human_dan.pro      | CSCQACGKEP | SHEGLSVYVQ | GEDGPGSQPG | THPHPHPHPH | PGGQTPEPED |
| human_beer.pro     | CKCKRLTRFH | NQSELKDFGT | EAARPQKGRK | PRPRARSAKA | NQAELENAY- |
|                    | 301        | 314        |            |            |            |
| human_gremlin.pro  | -----      | -----      |            |            |            |
| human_cerberus.pro | -----      | -----      |            |            |            |
| human_dan.pro      | PPGAPHTEEE | GAED       |            |            |            |
| human_beer.pro     | -----      | -----      |            |            |            |

Figure 1

# Human Beer Gene Expression by RT-PCR

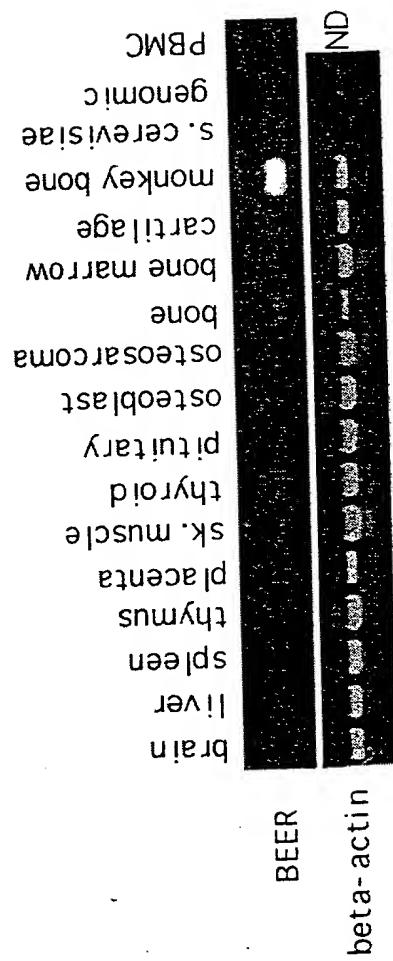
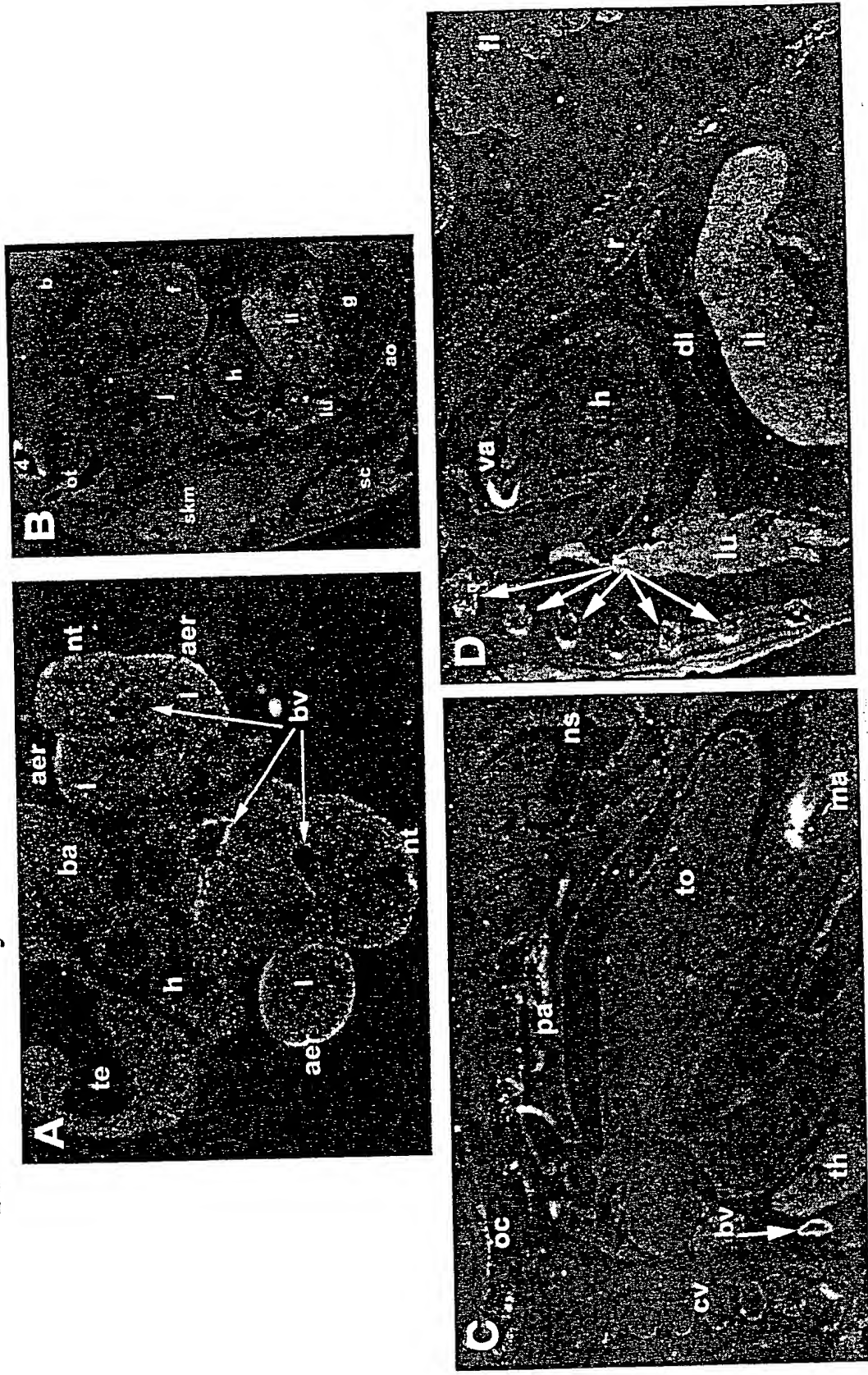


Fig. 2

# RNA In Situ Hybridization of Mouse Embryo Sections



*Fig. 3*

# Antibody Selectivity

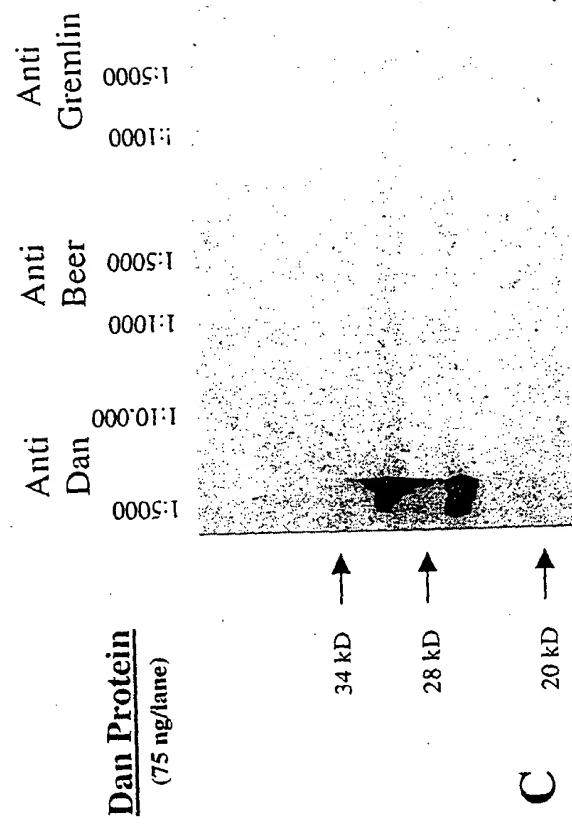
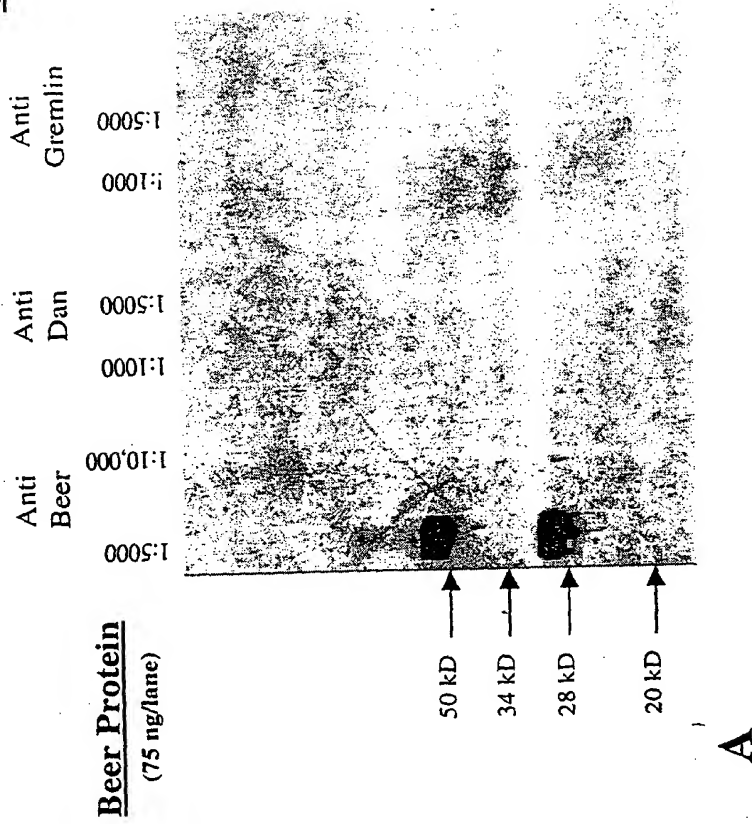
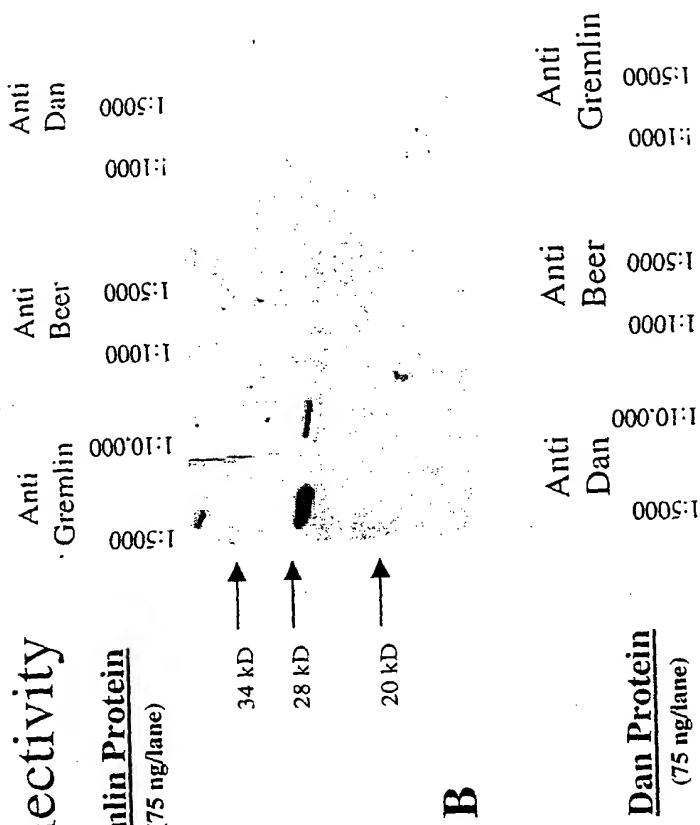


Fig. 4

| Beer | BMP-6 | BMP-6 control |
|------|-------|---------------|
| +    | +     | -             |
| +    | +     | -             |

\*Anti-BMP-6 western blot

\*Anti-BMP-5 western blot

\*Anti-BMP-4 western blot

Fig. 5

# BMP-5/Beer Dissociation Constant Characterization

.75 1.5 7.5 15 30 60 120 nM BMP-5



\*Anti-FLAG immunoprecipitation \*Anti-BMP-5 western blot

## Ionic Disruption of BMP-5/ Beer Binding

| NaCl(mM) | 500 | 150 | 150 |
|----------|-----|-----|-----|
| Beer     | +   | +   | -   |
| BMP-5    | +   | +   | +   |

BMP-5 western control



\* Anti FLAG immunoprecipitation  
\*Anti BMP-5 western

**Fig. 6**